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Further Evidence on the Effect of Acquisition Policy and Process on Cost Growth


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Graduate School of Business and Public Policy
Naval Postgraduate School
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- This briefing is drawn from:
 - David McNicol, David Tate, Sarah Burns, and Linda Wu, “Further Evidence on the Effect of Acquisition Regime on Cost Growth,” IDA Paper P-5330 (Draft Final), April 2016.
- That paper extends results presented in:
 - David McNicol and Linda Wu, “Evidence on the Effect of DoD Acquisition Policy and Process and Funding Climate on Cost Growth of Major Defense Acquisitions Programs,” IDA Paper P-5126, September 2014.
- These results were presented at last year’s NPS Acquisition Research Symposium.
- Both papers were sponsored by the Director, Performance Assessments and Root Cause Analyses.
- The project attempts a quantitative assessment of the effects of changes in acquisition policy and process on MDAP outcomes.

1st Observation:

(a) The Packard reforms of 1969 significantly reduced average APUC growth. (b) Additional reforms over about the next 25 years did not further reduce APUC growth. (c) During the AR years, APUC growth returned to nearly its 1960 level.


Acquisition Regime		Average APUC Growth*	
McNamara-Clifford	1964–1969	85% (20)	a
Defense Systems Acquisition Review Council (DSARC)	1970–1980	39% (53)	
Post Carlucci Initiatives DSARC	1987–1989	44% (12)	
Defense Acquisition Board (DAB)	1990–1993	32% (11)	c
Acquisition Reform (AR)	1994–2000	78% (27)	
DAB post AR	2001–2002	113% (6)	

b

* Normalized for changes in quantity.

2nd Observation:

(a) MDAPs that passed MS II/B during McNamara-Clifford and during AR had significantly higher proportions of programs that experienced extremely high APUC growth.* (b) The proportions across acquisition regimes were not significantly different at 50 percent and 100 percent.

Acquisition Regime		Average APUC Growth**	≥ 50%	≥ 100%	≥ $\bar{X} + S$
McNamara-Clifford	1964–1969	85% (20)	10	6	4
DSARC	1970–1980	39% (53)	19	7	0
Post-Carlucci DSARC	1987–1989	44% (12)	4	3	1
DAB	1990–1993	32% (11)	5	1	0
Acquisition Reform	1994–2000	78% (27)	11	7	7
DAB post-AR	2001–2002	113% (6)	2	1	1

* Extremely high APUC growth: at least one standard deviation (S) above the sample mean (\bar{X}) for bust periods. $\bar{X} + S = 143\%$.

** Normalized for changes in quantity.

3rd Observation:

There is no statistical significant association between acquisition regime and average APUC growth in bust funding climates when extremely high cost growth observations* are excluded.

Acquisition Regime		Average APUC Growth**
McNamara-Clifford	1964–1969	43%
DSARC	1970–1980	39%
Post Carlucci Initiatives DSARC	1987–1989	34%
Defense Acquisition Board (DAB)	1990–1993	32%
Acquisition Reform (AR)	1994–2000	18%
DAB post AR	2001–2002	40%

* APUC growth greater than $\geq \bar{X} + S = 143\%$.

** Normalized for changes in quantity.

- The crucial statistically visible effects of acquisition regimes are on the relative frequency of extremely high cost growth programs (2nd Observation).
- Apart from the effects on extremely high cost growth programs, there is not a statistically significant association between changes in acquisition regime and average APUC growth of programs that passed MS II/B during the regime. (3rd Observation)
- This does not imply that OSD-level oversight of MDAPs has no effect. It does imply, however, that changes in OSD-level acquisition policy and process relative to McNamara-Clifford did not make APUC growth either better or worse for MDAPs that passed MS II/B during bust funding periods.

- It seems unlikely that further changes in acquisition policy or process will have a major effect on cost growth.
- The relevant context for understanding APUC growth is the interface between the acquisition process and the program/budget process.
- The root causes of cost growth arguably lie in a mismatch among mission and functions, force structure, and function.
 - When something must give, something does give.
 - Extremely optimistic programmatic or cost assumptions may appear to be the least bad option.
- The underlying cause of persistent high APUC growth is not a deeply established culture of the DoD acquisition organizations and their professional employees.

- The Effect of Post MS II/B Funding Climate on Cost Growth.
- Further Evidence on the Effect of Acquisition Regime and Funding Climate on RDT&E Growth (parallel to P-5330's analysis of APUC growth).
- Further Evidence on the Effect of Acquisition Regime and Funding Climate on Truncations and Cancellations (IDA P-5218)
- IDA publication that consolidates this work and P-5126, P-5218, and P-5330.

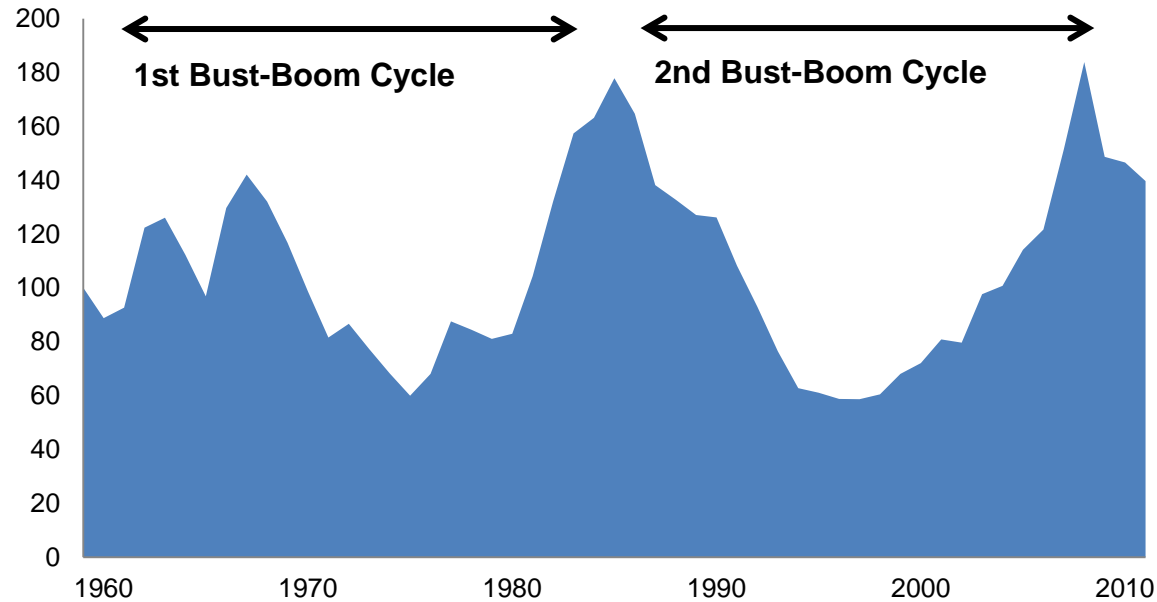


Backup

The Outcome Metric—Growth in Average Procurement Unit Cost (APUC)

- The research used APUC growth for 190 Major Defense Acquisition Programs (MDAPs) that passed MS II/B during FY 1970–FY 2007.
 - Each of these MDAPs went into production.
 - There are no cancelled programs in the sample.
- APUC growth is measured from the MS II/B baseline and normalized to the MS II/B total quantity acquired.
- APUC growth over the entire acquisition cycle is associated with the Fiscal Year in which the MDAP passed MS II/B; for example:
 - APUC growth for the F-22 over FY 1991–FY 2006 is assigned to FY 1991, the year in which the F-22 passed MS II.
 - The average APUC growth for FY 1987–FY 1993 is the average quantity normalized PAUC growth of all MDAPs that passed MS II during those years.

Budget Authority Appropriated for Procurement, 1960–1982*



* In Billions of Constant FY 2015 Dollars.

Source: "National Defense Budget Estimates for FY 2014," Office of the Under Secretary of Defense (Comptroller), May 2013, Table 6-8, 142–148.

Selection of Break Points between Funding Climates



- This research used only two funding climate categories—Relatively Constrained and Relatively Accommodating.
- Our touchstone in selection of break points was major shifts in the expectation about future funding of senior DoD decision makers.
- We used three events to identify the break points between funding climates:
 - The invasion of Afghanistan by the USSR in late December 1979;
 - The passage of the Gramm-Rudman-Hollings Act in December 1985; and
 - The terrorist attack on the U.S. on Sept. 11, 2001.
- Senior decision makers could reasonably expect each of these events to result in major and sustained changes in the defense funding climate.
- After examining contemporary policy statements and events, we selected:
 - FY 1981 as the first year of the Carter-Reagan buildup;
 - FY 1986 as the final year of the Carter-Reagan buildup; and
 - FY 2003 as the first year of the post-9/11 defense buildup.

Are there Other Factors that Must Be Considered?

- The statistical examinations consider only two factors bearing on MDAP outcomes—acquisition regime and funding climate.
- The results are not compromised by the omission of factors that are uncorrelated with either acquisition regime or funding climate—e.g., a tendency towards increased complexity in MDAPs over time.
- The results for these two factors would be compromised by omission of factors important to cost growth that are also correlated with acquisition regime or funding climate.

The results sought are not directly about the causes of cost growth, but, rather, when and where cost growth occurs:

- When, in terms of chronology and of the point in the acquisition cycle at which the main seeds of cost growth are sown; and
- Where, in terms of which bureaucratic processes are implicated.

Acquisition Regime				
McNamara-Clifford	Operated only in a bust funding climate			
Defense Systems Acquisition Review Council (DSARC)	1970–1980	N = 53	1981–1982	N = 9
Post Carlucci Initiatives DSARC	1987–1989	N = 12	1983–1986	N = 34
Defense Acquisition Board (DAB)	Operated only in a bust funding climate			
Acquisition Reform (AR)	Operated only in a bust funding climate			
DAB post AR	2001–2002	N = 6	2003–2007	N = 17



Three acquisition regimes operated in both funding climates. These provide a way to gauge the effect of funding climate, given acquisition regime.

Sample Probability of Cancellation by PAUC Growth Category

Average PAUC Growth	25 MDAPs that were Cancelled	151 MDAPs that were not Cancelled	Sample Probability of Cancellation
≥ 50%	40% (10)	26% (40)	20% (10 of 50)
≥ 30% but <30%	0 (0)	11% (17)	0 (0 of 17)
0 to 30%	40% (10)	46% (64)	14% (10 of 74)
<0	20% (5)	19% (30)	15% (5 of 35)
Total	100% (25)	100% (151)	14% (25 of 176)

Source: IDA P-5218, pp. 9-10.

Contrary to the conventional wisdom, the probability that an MDAP will be cancelled is not strongly dependent on the level of cost growth it experiences.

Acquisition Regime			
McNamara-Clifford	↓		
Defense Systems Acquisition Review Council (DSARC)			1964–1969 N = 20
Post Carlucci Initiatives DSARC			1970–1980 N = 53
Defense Acquisition Board (DAB)			1987–1989 N = 12
Acquisition Reform (AR)			1990–1993 N = 11
DAB post AR			1994–2000 N = 27
			2001–2002 N = 6
	↓		
			not observed
			1981–1982 N = 9
			1983–1986 N = 34
			no observations
			no observations
			2003–2007 N = 17

Each funding climate is analyzed separately. All six acquisition regimes operated during periods of bust funding; only three of the regimes operated during boom periods. We looked at both average APUC growth and the proportion of MDAPs with extremely high APUC growth.

Average Annual MDAP Cancellation Rates in Two Funding Climates

Acquisition Regime	Sharply Decreasing Funding		Stable or Increasing Funding	
	Period	Cancellation Rate	Period	Cancellation Rate
DSARC			1970–1982	0.5/yr.
Post-Carlucci DSARC	1986–1989	2.3/yr.	1983–1985	0.3/yr.
DAB	1990–1993	3.3/yr.		
AR			1994–2000	0.4/yr.
DAB post AR	2009–2012	2.8/yr.	2001–2008	1.3/yr.

Annual average cancellation rates are much higher when procurement funding is sharply decreasing than when it is stable or increasing.

Average Cancellation Rates for Cohorts, by Acquisition Regime and Funding Climate

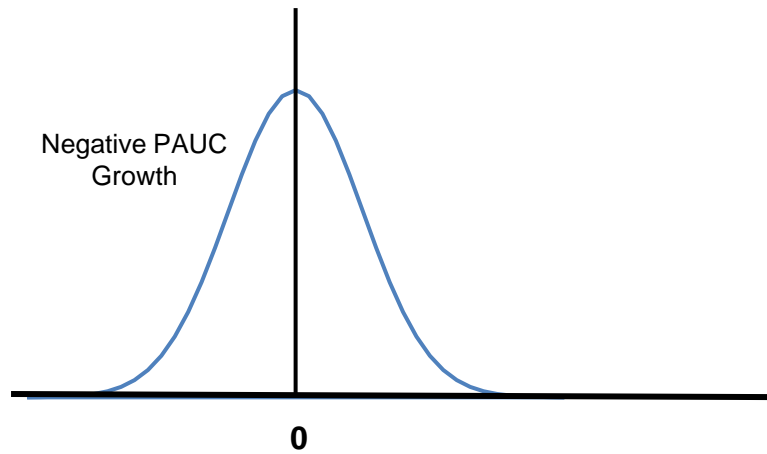


Acquisition Regime	Period	Cancellation Rate	Period	Cancellation Rate
DSARC	1970–1980	14% (10/74)	1981–1982	24% (4/17)
Post-Carlucci DSARC	1987–1989	42% (11/26)	1983–1986	12% (6/51)
DAB	1990–1993	7% (1/15)		
AR	1994–2000	14% (6/43)		
DAB post AR	2001–2002	27% (4/15)	2003–2007	30% (11/37)

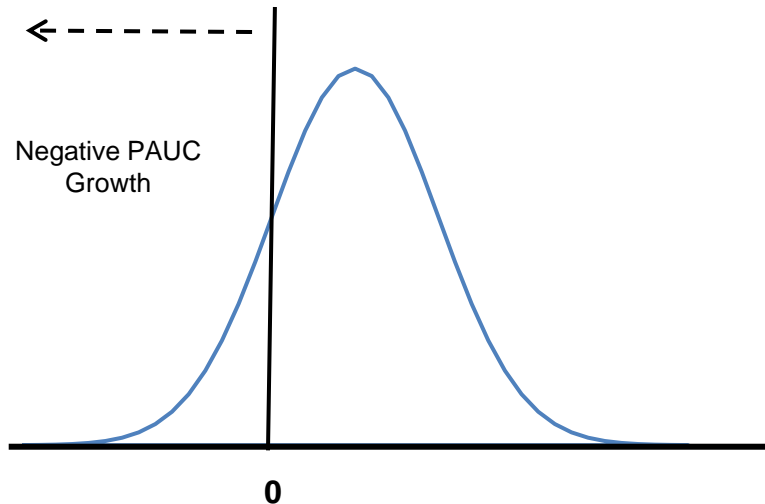
Note: Number of cancellations and cohort size in parentheses.

The high cancellation rate of the 1987–1989 cohort probably reflects a situation unique to the 2nd Reagan Administration. The DAB post AR also had a comparatively high cancellation rate for both funding climates. Otherwise, there does not seem to be an association between cohort cancellation rates, acquisition regime, and funding climate.

Bias in the MS II/B PAUC Estimate and the Frequency of PAUC Growth ≥ 50 Percent and Negative PAUC Growth



**Relatively Accommodating
Funding Climate**



**Relatively Constrained
Funding Climate**